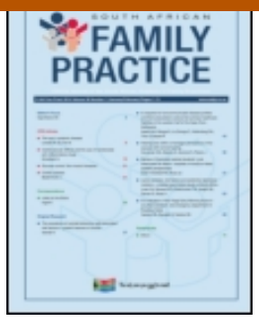

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RESEARCH

Development of a diabetes mellitus nutritional management manual for South African healthcare professionals

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Background: The objective was to develop a standardised education manual for healthcare professionals in South Africa on the nutritional management of diabetes mellitus.
Method: The manual was developed using seven steps: needs assessment and problem definition, a literature search, the first draft of the manual, peer review, the second draft of the manual, expert panel evaluation and the final manual.
Results: Following the literature search, the first draft of the manual was developed and sent for peer review and language editing. Recommended changes were made and the second draft was developed and sent to 77 dietitians, of whom the majority were satisfied with the content, which led to the final manual.
Conclusion: A diabetes mellitus nutritional management manual for healthcare professionals in South Africa was developed using a systematic approach using peer review and expert panels. The next step will be to evaluate its impact on the knowledge of healthcare professionals.

Keywords: diabetes mellitus, medical nutrition therapy, professional development, South Africa

Introduction

Diabetes mellitus is a worldwide epidemic that is affecting individuals in both developed and developing countries. By the year 2025, an estimated 228 million people around the globe will be affected, of whom 75% will be from developing countries.[1] Diabetes mellitus prevalence will increase to 187 million by 2025 in sub-Saharan Africa specifically.[2] With 38–88% of all diabetes mellitus cases being attributed to weight gain,[3] and urbanisation being one of the causes for the rise in obesity,[4] it is no wonder that developing countries are so dramatically affected.

Diabetes mellitus is a chronic illness, with patients requiring continuous medical care, support and constant self-management education to help to prevent the acute and chronic complications associated with the disease. The care of the diabetic patient is multifaceted, and many issues, other than glycaemic control, need to be addressed.[5] Because of the complexity of diabetes mellitus, a multidisciplinary team of healthcare professionals (HCPs)[6] is required for optimal and effective treatment and management, and to prevent the development of secondary complications. Members of the team must agree on the treatment goals and provide continuous, consistent and accessible care, while educating, supporting and involving the patient and his or her family in the decision-making process.[7]

Medical nutrition therapy (MNT) is the use of nutritional interventions to treat an injury, disease or condition.[8] Abnormalities in carbohydrate, protein and fat metabolism associated with diabetes mellitus are caused by deficient insulin action on target tissues.[9] Optimal diabetic control requires the restoration of normal carbohydrate, protein and fat metabolism by means of MNT.[10] Therefore, the treatment and management of diabetes mellitus is closely associated with MNT, making it vital for all HCPs in the treatment team to have accurate and up-to-date knowledge of nutrition with regard to its treatment and control.[11]

There is global inconsistency in diabetes mellitus care, both within and between countries, demonstrating the importance of the development of consistent education tools for HCPs.[12] A good quality tool, tested to ensure validity, can promote consistency in care by improving diagnostic accuracy and ensuring appropriate medical treatment by eliminating the use of ineffective interventions.[13] The International Diabetes Federation strongly advises that developers of new diabetes manuals use published guidelines as a foundation on which to develop the so-called "derived guidelines". This method is more efficient and cost-effective than developing full-process guidelines, which are developed using primary sources.[12] Various diabetes mellitus guidelines have been published in countries around the world, but none of them provide detailed information on the nutritional care of the diabetes mellitus patient. To ensure that diabetes mellitus patients receive the same standard of care everywhere,[12] the continuing professional development (CPD) of HCPs with respect to diabetes mellitus care guidelines is essential.[14]

South Africa is a developing country, comprising different socio-economic groups and a variety of different cultures and religions. Therefore, the aim of the study was to develop a marketable, CPD-accredited training manual which focuses on the role of MNT within the diabetes self-management education framework for HCPs in the multidisciplinary team, and which is suitable within the South African context.

Method

The manual was developed based on a model designed by the Nursing Science Department of the University of Utrecht,[15] and comprised the following steps:

Step 1: Needs assessment and problem definition.
Step 2: Information collection.
Step 3: First draft of the manual.
Step 4: Evaluation by three expert dietitians.
Step 5: Second draft of the manual.
Step 6: Evaluation by an expert panel.

Step 7: The final manual.

The study was approved by the Human Research Ethics Committee of Stellenbosch University. Written information and consent were obtained from the participants before their inclusion in the study.

Step 1

During Step 1, definition of the problem at hand and the focus of the education tool were developed. A random sample of 100 dietitians and nurses in all provinces of South Africa was selected. Their knowledge regarding nutrition and diabetes mellitus management was tested using a validated nutrition and diabetes management questionnaire.

Step 2

With the problem defined, the search and collection of relevant information was initiated in Step 2. The latest internationally published data on diet, nutrition and diabetes mellitus management, as well as position and consensus statements from various leading bodies and diabetes manuals from various countries, were collected and graded to determine the strength of evidence before consideration for inclusion in the manual.

Step 3

The collected information was used to compile comprehensive guidelines on the nutritional management of diabetes mellitus in Step 3, starting with basic information, and progressing to more detailed information on diet and nutrition in various situations.

Step 4

In Step 4, the first draft of the manual was sent for peer review to three expert dietitians specialising in diabetes care and manual development.

Step 5

A second draft of the manual was developed in Step 5, based on comments made by the reviewers.

Step 6

An expert panel (n = 77) consisting of registered dietitians in South Africa, working either in the private or public healthcare sector, were invited to read the manual and provide feedback regarding perceived knowledge, improvement and expected service delivery improvement, as well as identification of the most interesting chapters and missing information in Step 6.

Step 7

Based on the expert panel's comments, the necessary changes were made and the final manual was compiled in Step 7.

Results

The needs assessment determined that HCPs in South Africa lack adequate knowledge on basic diabetes mellitus management, including the role of MNT.

Table 1: Breakdown of the sections and chapters (with graded main sources) of the diabetes mellitus nutritional management manual developed for South African healthcare professionals[20]

Section	Chapter and title	Main sources	Evidence strength
1	1: Physiology of diabetes mellitus	Guyton and Hall[21]	I
	2: Classification of the different types of diabetes mellitus	The ADA[9]	I
2	3: Clinical diagnostics	The ADA,[9] the CDA,[22] the IDF and the WHO[23]	I
3	4: Targets for control	The ADA[24] and the CDA[22]	I
4	5: Pharmacological treatment	The ADA[24]	I
5	6: Acute complications associated with diabetes mellitus	The ADA[24]	I
6	7: Dietary approaches	The ADA,[10] and the FAO/WHO[25]	I
7	8: Diabetes mellitus and exercise	The ADA,[26] American College of Sports Medicine,[27] Diabetes Outreach diabetes manual,[28] Lumb and Gallen,[29] and the ISPAD[30]	I
8	9: Children and diabetes mellitus	The ADA[38] and the ISPAD[22]	I
9	10: Diabetes mellitus and special circumstances	The ADA[32] and the CDA[22] Expert opinion and experience	IV
	11: Religion and diabetes mellitus	Quresh[33]	IV
10	12: Sweeteners	The CDA[22]	I
		Wolever et al[34]	III
	13: Supplements and diabetes mellitus	Campbell,[35] and Ruhe and McDonald[36]	III
		Reljanovic et al[37]	I
11	14: Management of the hospitalised diabetic	The ADA[5]	I
	15: Diabetes mellitus in correctional institutions	The ADA[31]	I
	16: Diabetes mellitus in the workplace	The ADA[39]	I
12	17: When to refer to a dietitian	Diabetes Outreach diabetes manual[28]	I

ADA: American Diabetes Association, CDA: Canadian Diabetes Association, FAO: Food and Agriculture Organization of the United Nations, IDF: International Diabetes Federation, ISPAD: International Society for Pediatric and Adolescent Diabetes, WHO: World Health Organization
I: Evidence from one or more randomised controlled trials
II: Evidence from one or more controlled, not randomised trials
III: Evidence from non-experimental descriptive studies, i.e. case-control, comparative or correlation studies
IV: Evidence from expert committee reports, or the opinions or clinical experience of respected authorities

During the information collection step, position and consensus statements from leading bodies were collected, including the American Diabetes Association, the Canadian Diabetes Association, the International Diabetes Federation and the World Health Organization, as well as published diabetes manuals from Australia, Canada and Scotland. In addition to this, the Cochrane Library, PubMed, Medline, Science Direct, Google Scholar and EBSCO*host* (under the sections of "Academic Search Premier" and "Health Source: Nursing/Academic Edition") were extensively searched for relevant published papers on the topics of diet, nutrition and diabetes treatment and management. A total of 132 published documents, including journal articles ($n = 65$), books or book chapters ($n = 14$), diabetes manuals and care guidelines ($n = 7$), as well as consensus and position statements ($n = 17$) from five diabetic or dietetic associations, were identified for inclusion in the manual after the grading of evidence (Table 1).

The first draft of the manual was developed, based on published papers identified during the literature search. Practical components, in the form of case studies, were added to help to explain certain topics that were otherwise difficult to understand.

Reviewer comments included the manual being too long, the chronological order of some topics needing alteration and certain sections being difficult to understand. These comments were considered and changes were made.

The manual was divided into 12 sections, comprising 17 chapters. Shorter chapters, or those with similar topics, were combined to create a section. A summary of each section was compiled and inserted at the beginning of the section. Each section was allocated a specific colour, which was used to colour the top right-hand margin to ease perusal of the document. Thereafter, the manual was sent for language editing.

All of the dietitians from the expert panel commented that the manual improved their diabetes mellitus knowledge, and that as a result, they would be able to provide an improved service to their diabetes mellitus patients. All of the chapters were considered useful, especially those on pharmacological treatment, carbohydrate counting, exercise, children and religion. In general, the comments were positive. 61.8% of the reviewers remarked that no changes were necessary, and 72.4% stated that all relevant topics were incorporated and that no additional information was required. Some reviewers ($n = 4$) said that the manual was too long, and pointed out inconsistencies that had arisen from different sources. These were identified and corrected. Additional topics mentioned for inclusion were the use of sliding-scale insulin for the critically ill, the long-term complications of diabetes mellitus, diabetes mellitus in association with human immunodeficiency virus/acquired immune deficiency syndrome, and a recent food exchange list. Final changes were made according to the comments and the manual was completed.

Discussion

Despite possessing inadequate nutrition knowledge, and not being knowledgeable about advances in the field of nutrition, nurses rarely participate in CPD activities that pertain to nutrition. This is a cause for concern as nearly 90% of nurses have reported that they are approached regularly by patients for nutrition advice.[16]

CPD activities improve knowledge and confidence, and also enhance evidence-based practice.[17] With the purpose of creating an evidence-based education manual for CPD purposes, a comprehensive literature review of various topics was compiled which relate to diabetes mellitus and nutrition.[18] Care was taken to include a variety of topics to provide new information, as well as to refresh old knowledge, ensuring up-to-date knowledge by HCPs.[19] The chapters with which HCPs were less familiar, such as religion and exercise, were found to be the most interesting by the expert panel.

Evidence used for full-process guideline recommendations should always be graded[12] to give the user an indication of the confidence that the guideline development group has in the recommendation.[20] This manual, a derived guideline, was compiled mostly from position and consensus statements and using the care guidelines of diabetic associations.[12] Additional information was gathered from available clinical trials and systematic reviews. The information in position and consensus statements, care guidelines, systematic reviews or meta-analyses was considered to be graded and thus unbiased good evidence (level I).[20] However, when such information was lacking, and information from clinical trials, as well as the websites of diabetic and dietetic associations was used, the grading of evidence was more complicated. In these cases, opinion was used to grade (level II, III or IV) the available information and consider it for inclusion.[20]

There are no recommendations to indicate what size the development group of an MNT manual should be. Considering the recommendations for diabetes guideline development groups, a possible limitation of the study was that the development group for this manual comprised only four people, instead of the recommended 12–15, which may have limited the content and led to bias.[20] However, considering that the manual focused only on the nutritional management of diabetes mellitus, and was developed as a derived guideline, bias was thus reduced.[12]

Conclusion

The South African population is diverse, consisting of a multitude of cultures, with people from varying socio-economic backgrounds practising numerous religions. For this reason, the use of diabetes mellitus manuals developed in other counties and for their populations, may not be appropriate. Thus, a manual for the South African population was required and developed.

Adequate information is available on various aspects of diabetes mellitus and nutrition for the purposes of compiling a comprehensive manual for HCPs on the nutritional management of diabetes mellitus patients. It is important that developers of CPD education material conduct a needs assessment before starting their development process and use good-quality information to ensure the development of evidence-based education material.

Implications for research and practice

The steps used to develop the manual can be used for the development of other evidence-based recommendations, CPD education material and healthcare manuals. The final step in completing the development process is validation[15,18] of the newly developed manual to ensure that it improves the knowledge of HCPs. Plans for future updating of the manual also need to be made to ensure that the information remains current.[12]

This manual may provide a starting point for the development of a South African diabetes medical management guideline, covering all areas of diabetes mellitus management from all of the relevant multidisciplinary groups. The manual "Diet and the nutritional management of diabetes mellitus" is available at the Nutritional Information Centre (http://www.sun.ac.za/english/faculty/healthsciences/nicus).

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